

CLAIMS

1. A drain socket for connecting an outlet of a trap drainage channel of a flush toilet unit and a drain pipe located external of the flush toilet unit,
5 said drain socket comprising:
 - a drain socket body provided with an inlet for coupling with the trap drainage channel and an outlet for coupling with the drain pipe;
 - a siphon inducing region provided on an inner wall of the drain socket body for inducing a siphon effect; and
- 10 a straightening vane provided upstream of the siphon inducing region of the drain socket body to extend from the inner wall in the inward direction of the channel.
2. The drain socket according to claim 1, wherein the siphon inducing region includes a contraction step provided near an outlet portion of the outlet of the drain socket body.
- 15 3. The drain socket according to claim 1, wherein the siphon inducing region includes a channel contraction section provided in the drain socket body.
- 20 4. The drain socket according to claim 3, wherein said socket further comprises a channel expansion section provided on the upstream side of the channel contraction section and the straightening vane is provided in the channel expansion section.
- 25 5. The drain socket according to claim 4, wherein the straightening vane is provided on the inner wall of the channel expansion section and channel contraction section to extend in the inward direction of the channel.

6. The drain socket according to any of claims 1 to 5, wherein the number of straightening vanes is in the range of from 2 to 16.

7. The drain socket according to any of claims 1 to 6, wherein the 5 length of the straightening vane from the inner wall in the inward direction of the channel is not less than 1 mm and not greater than $(D_1 - D_2) / 2$ mm, where D_1 mm is the inside diameter of the channel inner wall at the section where the straightening vanes are provided and D_2 mm is the inside diameter of the outlet of the drain socket.

10

8. The drain socket according to any of claims 1 to 7, wherein the thickness of the straightening vane is not less than 2 mm and not greater than 40 mm.

15

9. The drain socket according to any of claims 1 to 8, wherein the spacing between the tips of the straightening vanes in the inward direction of the channel is equal to or greater than 10 mm and equal to or less than 100 mm.

20

10. The drain socket according to any of claim 4 to 9, wherein a region of the drain socket body at the boundary between the channel expansion section and channel contraction section is constituted as a divisible structure.

25

11. The drain socket according to any of claim 3 to 10, wherein the drain socket body is structured to establish the relationship $L > D$, where L is the length of the region between the channel contraction section and the outlet and D is the inside diameter thereof.

30

12. The drain socket according to any of claims 1 to 11, wherein the

drain socket body comprises a toilet socket module provided at the inlet thereof for accommodating the outlet of the trap drainage channel and a drain pipe socket module provided at the outlet thereof for insertion into the drain pipe.

5

13. The drain socket according to any of claims 1 to claim 12, wherein the drain socket has a lateral pipe section extending laterally a predetermined distance between the channel contraction section and outlet.

10 14. A flush toilet comprising a drain socket according to any of claims 1 to 13 and a flush toilet unit in an integrated structure.

15. A drain socket for connecting an outlet of a trap drainage channel of a flush toilet unit and a drain pipe located external of the flush toilet unit, 15 said drain socket comprising:

a drain socket body provided with an inlet for coupling with the trap drainage channel and an outlet for coupling with the drain pipe;

a channel contraction section provided in the channel of the drain socket body;

20 a guide groove provided on the downstream side of the channel contraction section continuously in the water flow direction; and

the entire channel in the drain socket body having an inside diameter equal to or larger than the inside diameter of outlet of the trap drainage channel.

25

16. The drain socket according to claim 15, wherein said drain socket further comprises a channel expansion section on the upstream side of the channel contraction section.

30 17. The drain socket according to claim 15 or 16, wherein the guide

groove is formed by cutting away a part of the channel contraction section.

18. The drain socket according to claim 15, wherein said drain socket further comprises a straightening vane provided at the channel contraction 5 section and the inner wall upstream thereof to extend in inward direction of the channel.

19. The drain socket according to claim 16, wherein said drain socket further comprises a straightening vane provided at the channel expansion 10 section and channel contraction section to extend in inward direction of the channel.

20. The drain socket according to any of claims 15 to 19, wherein the number of guide grooves is in the range of from 2 to 16.

15

21. The drain socket according to any of claims 15 to 20, wherein the depth of the guide groove is equal to or greater than 1 mm and equal to or less than 15 mm.

20

22. The drain socket according to any of claims 15 to 21, wherein the width of the guide groove is not less than 2 mm and not greater than 30 mm.

25

23. The drain socket according to any of claims 15 to 22, wherein guide grooves are provided at a spacing of the tips in the inward direction of the channel of equal to or greater than 5 mm and equal to or less than 100 mm.

30

24. The drain socket according to any of claims 15 to 23, wherein a region of the drain socket body at the boundary between the channel contraction section and guide groove is constituted as a divisible structure.

25. The drain socket according to any of claims 15 to 24, wherein the drain socket body is structured to establish the relationship $L > D$, where L is the length of the region between the channel contraction section and 5 outlet provided with the guide groove and D is the inside diameter thereof.
26. A flush toilet comprising a drain socket according to any of claims 15 to 25 and a flush toilet unit.
- 10 27. A drain socket to be arranged to connect an outlet of a trap drainage channel of a flush toilet unit and a drain pipe located external of the flush toilet unit whose center is eccentrically located with respect to the center of the outlet, said drain socket comprising:
- 15 an inlet for coupling with the outlet of the trap drainage channel;
- a channel expansion section in whose inside diameter expands toward the downstream side from the inlet;
- a deflector plate extending in the inward direction from the inner wall of the channel expansion section;
- 20 a siphon inducing shelf formed at the downstream end of the channel expansion section to extend at least on the side in the direction opposite from the direction of eccentricity; and
- a bent pipe that extends from the downstream end of the channel expansion section and whose downstream end couples with the drain pipe.
- 25 28. The drain socket according to claim 27, wherein the deflector plate is formed only on the inner wall of the channel expansion section on the side in the direction opposite from the direction of eccentricity.
29. The drain socket according to claim 27 or 28, wherein the deflector 30 plate is formed to be spaced apart from the siphon inducing shelf.

30. The drain socket according to any of claims 27 to 29, wherein the deflector plate is of generally triangular shape, a first side of the triangular shape being joined to the inner wall of the channel expansion section, a
5 second side being directed substantially horizontally, a third side being directed so that an extension thereof lies substantially tangent to the inner wall of the bent pipe on the side in the direction opposite from the direction of eccentricity, and an apex between the second side and the third side is rounded.

10

31. The drain socket according to claim 29 or 30, wherein a gap between the deflector plate and the siphon inducing shelf is between 5 and 15 mm.

32. The drain socket according to any of claims 28 to 31, wherein the
15 siphon inducing shelf is formed to be widest at the middle and to narrow progressively in the direction of eccentricity.

33. The drain socket according to any of claims 27 to 32, wherein the deflector plate extends farther inward than the siphon inducing shelf.

20

34. The drain socket according to any of claims 27 to 33, wherein the end portion of the bent pipe on the downstream side is constituted as a straight pipe.

25 35. The drain socket according to any of claims 27 to 34, wherein said drain socket further comprises a coupling flange for supporting the bent pipe on the floor on which the flush toilet unit is to be installed, the end of the bent pipe on the downstream side being above the floor when the coupling flange is set on the floor.

30

36. A flush toilet comprising a drain socket according to any of claims 27 to 35 and a flush toilet unit.